Final Abstract

Final Report Approved on November 28, 2024

M.L. 2021 Project Abstract

For the Period Ending June 30, 2024

Project Title: Pollinator Education in the Science Classroom

Project Manager: Elaine Evans

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Funding Source:

Fiscal Year:

Legal Citation: M.L. 2021, First Special Session, Chp. 6, Art. 6, Sec. 2, Subd. 05b

Appropriation Amount: $366,000

Amount Spent: $360,674

Amount Remaining: $5,326

Sound bite of Project Outcomes and Results

Pollinators in the Science Classroom trained 59 Minnesota grade 6-12 science/agriculture teachers to increase their knowledge of pollinator biology, diversity, habitat, and conservation by sharing expert-guided information and action steps. Collectively, teachers self-reported using pollinator curriculum resources and Pollinator Toolkits with over 6,300 students in 18 counties.

Overall Project Outcome and Results

Pollinators in the Science Classroom (PSC) increased knowledge of action steps to conserve pollinators by training 59 Minnesota science/agriculture teachers of grades 6-12 in pollinator education methods. Collectively, teachers self-reported using PSC curriculum and Pollinator Education Toolkit with over 6,500 students in 18 Minnesota counties, and that they will continue to use these methods to disseminate information to future students. Participants learned about Minnesota pollinator biology, diversity, habitat, and conservation from experts from the University of Minnesota and Monarch Joint Venture, gathered data for projects including The Great Sunflower Project, iNaturalist, and the Monarch Larva Monitoring Project, and conducted their own pollinator research to prepare them to lead students in outdoor ecological investigations. Teachers received a Toolkit and curriculum resources as well as training to utilize them as they

share pollinator biology and conservation content with their students. We provided support and resources throughout the school year to mobilize teachers to engage their students. Teachers created or improved over 6,000 square feet of pollinator habitat at their schools so students can support and investigate pollinating insects. PSC was highly successful, based on teachers' feedback, gains in knowledge and confidence, and numbers of students impacted, among other metrics. The accomplished goals of PSC benefit Minnesotans by increasing knowledge of pollinator conservation steps throughout Minnesota. When followed, these action steps will result in increases in pollinator habitat and pollinator populations, and increases in pollination services and other vital ecological services.

Project Results Use and Dissemination

During the Pollinators in the Science Classroom (PSC) workshop leaders and participants developed resources to support educators to teach about pollinator biology and conservation. Many of these resources have been compiled and are available on the Pollinator Classroom Resources page on the UMN Bee Lab website. We also expanded the Pollinator Education Toolkits to include a trivia game card set and a bee trading card set. Teachers who participated in the program continue to disseminate information to their students and colleagues through the classroom activities they developed during the program and the materials we provided them with.

Environment and Natural Resources Trust Fund

M.L. 2021 Approved Final Report

General Information

Date: December 19, 2024

ID Number: 2021-131

Staff Lead: Noah Fribley

Project Title: Pollinator Education in the Science Classroom

Project Budget: $366,000

Project Manager Information

Name: Elaine Evans

Organization: U of MN - College of Food, Agricultural and Natural Resource Sciences

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Project Reporting

Final Report Approved: November 28, 2024

Reporting Status: Project Completed

Date of Last Action: November 28, 2024

Project Completion: June 30, 2024

Legal Information

Legal Citation: M.L. 2021, First Special Session, Chp. 6, Art. 6, Sec. 2, Subd. 05b

Appropriation Language: $366,000 the first year is from the trust fund to the Board of Regents of the University of Minnesota to educate approximately 5,000 students about pollinator conservation by providing professional development for science teachers to integrate pollinator education curriculum and materials into their classrooms and by evaluating the program to improve its effectiveness.

Appropriation End Date: June 30, 2024

Narrative

Project Summary: Pollinator Education in the Science Classroom will provide professional development for 58 science teachers to use pollinator education curriculum and outreach materials, ultimately reaching >6000 students annually.

Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.

Native pollinators are important for crop production and ecosystem health. Declines in the health and diversity of pollinators are a threat to food security and ecosystem stability. Roughly one-third of our food supply is dependent on pollinators. Over 80% of all plants depend on pollinators for reproduction. The recent designation of the endangered rusty-patched bumble bee as the Minnesota State Bee highlights both interest in and conservation need for Minnesota native pollinators. Due to increased awareness, many Minnesotans have taken action to help pollinators by planting pollinator habitat and participating in efforts to document pollinator populations. However, effective conservation requires broad engagement across all sectors of the community.

One way to reach Minnesotans with in-depth information on pollinators is to work with science teachers in their communities. Teachers often seek new curricula with content that is relevant to their students' lives and also allows them to meet the teaching objectives of the state science standards. However, implementing and understanding new curricula can be a daunting task. We have found that pairing a summer workshop that presents new material with support during the school year helps teachers overcome this barrier and leads to long-term adoption of teaching techniques and content.

What is your proposed solution to the problem or opportunity discussed above? Introduce us to the work you are seeking funding to do. You will be asked to expand on this proposed solution in Activities & Milestones.

Existing pollinator education resources (Driven to Discover Pollinator Curriculum and UMN Pollinator Education Toolkits) provide tools for middle- and high-school teachers to integrate pollinator education into their science classrooms. Additional training from pollinator experts and lead teachers helps teachers to most effectively use these existing pollinator education resources to increase pollinator conservation action in Minnesota families. The planned workshops are modeled after the successful Driven to Discover Citizen Science teacher workshops. Classroom teachers attend workshops led by science content experts who provide additional background and context for the curriculum as well as fellow teachers familiar with the curriculum who help with effective classroom implementation. Pollinator Education in the Science Classroom workshops will bring in experts on bee and butterfly pollinators to provide detailed background information to enable adaptation on Pollinator Curriculum and Pollinator Education Toolkits to specific classroom needs. The Pollinator Education Toolkits emphasize not only awareness of pollinator conservation but also pollinator conservation actions. By engaging an evaluation consultant, we will be able to more effectively document our impact on pollinator conservation. By integrating pollinator education into the science classroom, a broad sector of Minnesotans will be exposed to pollinator conservation needs as well as concrete actions to improve the state of pollinators in Minnesota.

What are the specific project outcomes as they relate to the public purpose of protection, conservation, preservation, and enhancement of the state's natural resources?

Pollinators are a key natural resource due to their role in maintaining ecosystem function. This program shares clear, expert-guided information and action steps with professional educators who will in turn reach thousands of students and their families. Action steps to conserve pollinators include creating and evaluating pollinator habitat, reducing exposure of pollinators to pesticides, and documenting pollinator populations to inform conservation efforts. The Pollinator Education Toolkits are designed to be updatable and will provide a connection for educators and their students to the latest in pollinator conservation.

Project Location

What is the best scale for describing where your work will take place?

Statewide

What is the best scale to describe the area impacted by your work?

Statewide

When will the work impact occur?

During the Project and In the Future

Activities and Milestones

Activity 1: Assist workshop teachers during the school year to implement pollinator education in their classrooms and schools.

Activity Budget: $59,059

Activity Description:
In our previous professional development programs for teachers, we have found that mentoring those teachers during the school-year greatly increases their success in implementing those materials in the classroom. Consequently, we will continue our work with the cohort of summer teachers through the school year. Specifically, the coordinator of the Pollinators in the Science Classroom will be a former school teacher who now specializes in teacher development. She will be in weekly contact with the teachers while they are implementing the program, visit the teacher's classrooms at least twice during the school year, and be on-call to problem-solve with the teachers as issues arise.

We have also found that our teachers benefit from re-convening during the school year. Consequently, we will host a mid-year, one-day workshop, where the teachers will be able to discuss their implementation problems and successes, share implementation tools that they have developed, and increase their knowledge of pollinator biology through a presentation by a guest pollination biologist.

Teachers attending the MnCOSE science educators' conference (see Activity #2) will be included in the school-year activities, including having access to Pollinators in the Science Classroom staff support, receiving monthly newsletters, having the opportunity to attend the mid-year one-day

Activity Milestones:

Description	Approximate Completion Date
Assist 18 workshop teachers implement pollinator curriculum during school year, reaching ~1,800 students	June 30, 2022
Assist 27 workshop teachers implement pollinator curriculum during school year, reaching ~2,700 students	June 30, 2023
Assist 9 science educators to implement pollinator curriculum during the school year, reaching 900 students.	June 30, 2024

Activity 2: Recruit and train middle- and high-school teachers in a two-week summer workshop using existing materials developed for pollinator education.

Activity Budget: $274,941

Activity Description:
We will use our well-developed network of over 1500 teachers to recruit participants. Also, we connect with science directors from dozens of school districts to reach beyond this network. Our recruitment will emphasize underserved urban and rural school districts.

During the summer workshop, we will spend one week using the NSF-funded Driven to Discover: Citizen Science Curriculum Guide, Pollinators and the Great Sunflower Project and the LCCMR/ENRTF Pollinator Education Toolkit to learn about pollinator biology, citizen science, and the scientific processes. The teachers will conduct independent scientific studies. During the second week, we will help the teachers plan for the implementation of the curriculum materials, use of the toolkit, and leading students in their own independent studies during the school-year.

Because of the late release of funds, we were not able to train 18 teachers in Summer 2021. Consequently, we taught 18 teachers in Summer 2022 and 27 teachers in Summer 2023. We will train 9 teachers in Fall 2023 at the MnCOSE science educators' conference to fulfill our teachers requirement of reaching a total of 54 teachers.

Our training team will consist of three pollinator biologists and three experienced lead educators who have previously implemented the workshop materials.

Activity Milestones:

Description	Approximate Completion Date
Train 18 teachers in pollinator education materials in two-week-long workshop during summer 2021.	August 31, 2021
Train 18 teachers in pollinator education materials in two-week-long workshop during summer 2022.	August 31, 2022
Train 18 teachers in pollinator education materials in two-week-long workshop during summer 2023.	August 31, 2023

Activity 3: Evaluate the Pollinator Education in the Science Classroom program to improve its effectiveness throughout the grant and after its completion.

Activity Budget: $32,000

Activity Description:
Pollinators in the Science Classroom will undergo rigorous, independent evaluation to assess and improve its quality. Specifically, the evaluator will examine workshop objectives and execution and the implementation of the pollinator curriculum and educational toolkit in classrooms. The evaluator will conduct formative evaluation while the program is happening in order to improve its execution and a summative evaluation at the end of the project to assess whether it met its objectives and milestones. Evaluation is a requisite component of all effective professional development programs for teachers. The Minnesota Department of Higher Education requires independent evaluation of all programs that it funds. The National Science Foundation requires that 10 - 15% of the budget be devoted to evaluation of any educational program that it funds. In addition, we will track pollinator conservation actions of program participants. The ENRTF-funded Habitat Assessment Guide for Pollinators in Yards, Gardens, and Parks will be used to evaluate pollinator habitat, guiding quality improvements. Classroom citizen science pollinator monitoring efforts will be collated and shared when impactful to pollinator conservation efforts.

A brief formative assessment will be conducted at the MnCOSE (MN Science Teachers Association Conference on Science Education) in Fall 2023.

Activity Milestones:

Description	Approximate Completion Date
Conduct formative evaluation of the summer training program and classroom implementation from 2021-2022.	June 30, 2022
Conduct formative evaluation of the summer training program and classroom implementation from 2022-2023.	June 30, 2023
Conduct long-term summative evaluation of the program impacts from 2021-2024.	June 30, 2024
Conduct formative evaluation of the MnCOSE workshop in Fall 2023.	June 30, 2024

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Katie-Lyn Bunney	Monarch Joint Venture	Pollinator scientist with expertise on Monarch butterflies. The Monarch Joint Venture (MJV) is a partnership of federal and state agencies, non-governmental organizations, businesses and academic programs working together to protect the monarch migration across the United States and based in Saint Paul, MN.	Yes

Dissemination

Describe your plans for dissemination, presentation, documentation, or sharing of data, results, samples, physical collections, and other products and how they will follow ENRTF Acknowledgement Requirements and Guidelines.
Pollinators in the Science Classroom will directly engage 58 teachers from a variety of school districts. In addition to the over 7000 students who will be reached by science teachers, many of these students will bring conversations about pollinator conservation home to their families. The educators we work with directly are encouraged to share the information they have gained with their colleagues. Other teachers and youth programs will be able to access the basic Pollinators in the Science Classroom training and classroom materials through the UMN Bee Lab Website (www.beelab.umn.edu/classroom) and the UMN Extension Environmental Education Website (https://extension.umn.edu/environmental-education/youth-programs-and-teacher-resources). Environment and Natural Resources Trust Fund will be acknowledged through use of the Trust Fund logo or attribution language on project print and electronic media, publications, signage, and other communications per the ENTRF Acknowledgment Guidelines.

Recruitment of Pollinators in the Science Classroom (PSC) grade 6-12 science teachers in the Twin Cities Metro as well as Greater Minnesota actively began on March 8, 2022. An invitation flyer was emailed to over 700 teachers and administrators, as well as organizations such as the Minnesota Science Teachers Association and the Minnesota Department of Education. The flyer directed interested teachers to the PSC Website, https://beelab.umn.edu/pollinators-science-classroom , where the PSC Application could be found. The goal was to recruit a total of 18 teachers, with 4 of those teachers being from Greater Minnesota. Within 2 weeks, 25 teachers had applied for PSC. All applicants were from the Twin Cities Metro. In response, a database containing contact information for 20 Greater Minnesota school districts was created, and the email invitation flyer was sent to an additional 280 teachers and administrators. Consequently, a total of 5 Greater MN teachers applied. The final total applicant count was 43.

The PSC Commitment Form was next sent to our applicants in April to confirm that they would attend all 8 days of the professional development workshop and were planning to incorporate the PSC curriculum with their students for the 2022-23 school year. 27 applicants submitted the Commitment Form. Of those 27 applicants, 18 were selected based on several factors, including if they applied with a co-teacher, which area of science they taught, and their answer to the application question, “Why would you like to participate in PSC?”. Those who were not initially selected were placed on a waiting list. Two of the original 18 participants had to withdraw for personal reasons, so 2 teachers on the waiting list were able to participate. All applicants not selected will be sent application information for the 2023-24 PSC program.

Long-Term Implementation and Funding

Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If additional work is needed, how will this work be funded?

Pollinator Education in the Science Classroom will be effective after the initial workshops. Teachers will be able to use the pollinator curriculum and toolkit for years after the training. The curriculum materials are available to download for free from the UMN Extension website on citizen science. Though we will not be able to provide the toolkits for free after the end of the grant, they will be available at no cost through inter library loan as well as for a cost of roughly $50 each for anyone who wishes to assemble updated, online toolkit components.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Minnesota Native Bee Atlas	M.L. 2015, Chp. 76, Sec. 2, Subd. 03g	$790,000
Pollinator Ambassadors Program for Gardens	M.L. 2018, Chp. 214, Art. 4, Sec. 2, Subd. 05f	$250,000

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount	$ Amount Spent	$ Amount Remaining
Personnel										
Web Support		The technician will maintain the project web site			33.5%	0.12		$8,288	-	-
Project Coordinator		The project coordinator will organize the summer workshops.			33.5%	1.14		$68,672	-	-
Project Programming		Plans teaching schedule of summer workshop and provides school-year support of teachers			36.5%	0.99		$52,198	-	-
Elaine Evans, Director of Project		Director of project in all facets.			36.5%	0.45		$48,693	-	-
Bee Scientist		Provides bee expertise during summer workshop			33.5%	0.15		$14,443	-	-
							Sub Total	**$192,294**	**$188,376**	**$3,918**
Contracts and Services										
Scientist -- Pollinator Biology	Subaward	The pollinator biologist -- Katie-Lyn Bunney -- works for the Monarch Joint Venture, a non-profit with international scope that is based in Saint Paul.				0.15		$9,000	$9,000	-
Lead Teachers	Professional or Technical Service Contract	The two lead teachers will be experienced classroom teachers familiar with the Driven to Discover project who will assist during the summer workshop, especially with helping the participants to plan for school-year implementation.				0.12		$15,548	$15,290	$258
Evaluation Specialist	Professional or Technical Service Contract	The evaluation specialist will conduct formative evaluation of the project meeting its objectives over all three years as well as summative evaluation of the entire project in meeting its objectives over the course of the project.				0.24		$32,000	$32,000	-
							Sub Total	**$56,548**	**$56,290**	**$258**

Equipment, Tools, and Supplies										
	Tools and Supplies	Materials for classroom implementation.	Materials to be used by teachers in implementing the program in their classroom. $175 dollars per classroom x 54 classrooms.					$10,850	$10,844	$6
	Tools and Supplies	Books and course materials.	For participant instruction. $75 per participant x 54 participants.					$4,050	$3,894	$156
	Tools and Supplies	Workshop Supplies	Supplies needed to teach e.g. easel paper, markers, petri dishes, tupperware. $258 per year.					$774	$773	$1
							Sub Total	**$15,674**	**$15,511**	**$163**
Capital Expenditures										
							Sub Total	**-**	**-**	**-**
Acquisitions and Stewardship										
							Sub Total	**-**	**-**	**-**
Travel In Minnesota										
	Miles/ Meals/ Lodging	Travel for Project Coordinator	Project Coordinator will be visiting schools across the state to recruit participants and to mentor them in their classrooms. Estimated 1,280 miles per year x $ 0.625 per mile x 3 years					$1,743	$1,743	-
							Sub Total	**$1,743**	**$1,743**	**-**
Travel Outside Minnesota										
							Sub Total	**-**	**-**	**-**

Printing and Publication										
	Printing	Printing of educational materials for teachers and their students.	Printing of materials that will be used in the workshop with the teachers and in the teacher's classrooms. Most of the Pollinator tool box cost is in printing materials. $146 per teacher in costs.					$14,890	$14,817	$73
							Sub Total	**$14,890**	**$14,817**	**$73**
Other Expenses										
		Stipends for all teacher participants.	Teachers receive stipends to attend professional development workshops. Stipend is $215 per day x 8 days x 18 teachers per year x 3 years,	X				$72,671	$72,053	$618
		Extra stipend for teacher participants from greater Minnesota.	Teachers from greater Minnesota will incur extra expenses to attend the summer workshop such as paying for a place to stay during the two weeks. Estimated 4 teachers at $800 per teacher.	X				$9,600	$9,384	$216
		Extra stipend for teacher leaders	Four participants from each year will be chosen to lead small study groups of 4 - 5 teachers during the school year. 4 x $215 x 3 yrs					$2,580	$2,500	$80
							Sub Total	**$84,851**	**$83,937**	**$914**
							Grand Total	**$366,000**	**$360,674**	**$5,326**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Other Expenses		Stipends for all teacher participants.	Teachers receive stipends to attend professional development workshops outside of their contract year. This is often dictated by their contracts and is used to offset expenses for attending including lost summer wages and child care. This is a mandatory feature of grants from the Minnesota Department of Higher Education and the National Science Foundation.
Other Expenses		Extra stipend for teacher participants from greater Minnesota.	Teachers from greater Minnesota incur added expenses to attend the two-week summer workshops in Saint Paul. This added stipend is calculated from the cost of two teachers sharing a room at a UMN dormitory.

Non ENRTF Funds

Category	Specific Source	Use	Status	$ Amount	$ Amount Spent	$ Amount Remaining
State						
			State Sub Total	**-**	**-**	**-**
Non-State						
			Non State Sub Total	**-**	**-**	**-**
			Funds Total	**-**	**-**	**-**

Attachments

Required Attachments

Visual Component

File: 760a04e9-203.pdf

Alternate Text for Visual Component

Pollinator Education in the Science Classroom will provide training and supplies in pollinator biology and citizen science for 58 teachers, which will ultimately reach more than 7,000 students annually. This will lead to documented impacts on pollinator habitat, reduced exposure of pollinators to insecticides, and help document pollinator populations to inform public policy....

Supplemental Attachments

Capital Project Questionnaire, Budget Supplements, Support Letter, Photos, Media, Other

Title	File
Background check certification	b48e2ac8-fa7.pdf
One page visual summary	07063062-a7d.pdf
Summative Evaluation	87af48c1-59c.pdf

Media Links

Title	Link
Pollinator Classroom Resources	https://beelab.umn.edu/pollinators-classroom-resources

Difference between Proposal and Work Plan

Describe changes from Proposal to Work Plan Stage

To reduce the budget from $430,000 to $366,000, we reduced the number of teachers from 20 to 18. This reduced the amount needed for materials as well as stipends. We also reduced the project coordinator position from 0.5 FTE per year to 0.38 FTE per year and the co-director from 0.15 FTE per year to 0.075 FTE per year.

Additional Acknowledgements and Conditions:

The following are acknowledgements and conditions beyond those already included in the above workplan:

Do you understand and acknowledge the ENRTF repayment requirements if the use of capital equipment changes?

N/A

Do you understand that travel expenses are only approved if they follow the "Commissioner's Plan" promulgated by the Commissioner of Management of Budget or, for University of Minnesota projects, the University of Minnesota plan?

Yes, I understand the UMN Policy on travel applies.

Does your project have potential for royalties, copyrights, patents, sale of products and assets, or revenue generation?

No

Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?

N/A

Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF?

N/A

Does your project include original, hypothesis-driven research?

No

Does the organization have a fiscal agent for this project?

Yes, Sponsored Projects Administration

Work Plan Amendments

Amendment ID	Request Type	Changes made on the following pages	Explanation & justification for Amendment Request (word limit 75)	Date Submitted	Approved	Date of LCCMR Action
1	Amendment Request	• Budget • Dissemination • Budget - Capital, Equipment, Tools, and Supplies • Activities and Milestones • Budget - Personnel • Budget - Professional / Technical Contracts • Budget - Travel and Conferences • Budget - Printing and Publication • Budget - Other	We adjusted our budget to move more funds out of Subawards into Personnel because of shifts in staff needs due to Rob Blair becoming becoming UMN FWCB Department head and need for a second bee scientist to work with small groups. We increased teacher stipends because of inflation and need to add compensation for work with for small groups. Supplies and printing have increased because of increased toolkit production cost due to inflation.	July 20, 2022	Yes	July 27, 2022
2	Amendment Request	• Budget • Activities and Milestones • Budget - Professional / Technical Contracts • Budget - Capital, Equipment, Tools, and Supplies • Budget - Printing and Publication • Budget - Other	We adjusted our activities and milestones due to late release of funds preventing workshops in 2021. Consequently, we taught 18 teachers in Summer 2022 and 27 teachers in Summer 2023. We will train 9 teachers in Fall 2023 at the MnCOSE science educators' conference to fulfill our goal of reaching a total of 54 teachers.	October 4, 2023	Yes	November 6, 2023
3	Amendment Request	• Budget • Other • Budget - Professional / Technical Contracts • Budget - Capital, Equipment, Tools, and Supplies • Budget - Travel and Conferences • Budget - Printing and Publication • Budget - Other	We received funding August 31, 2021 preventing 2021 summer programming and reducing from three to two cohorts. Increase "personnel" by $22,418 for time to increase teacher participation in second cohort and create additional educational materials. Increase "supplies" by $1,400 and "printing" by $7,000 for education materials.	April 29, 2024	Yes	May 8, 2024

			Decrease “professional/technical contracts” by $9,952, “travel and conferences” by $657, and “other” (teacher stipends) by $20,209 due to two instead of three years.			
4	Amendment Request	• Budget - Personnel • Budget - Professional / Technical Contracts • Budget - Capital, Equipment, Tools, and Supplies • Budget - Travel and Conferences • Budget - Printing and Publication • Budget - Other	In my previous request I neglected to make the appropriate changes in the specific budget fields. We received funding August 31, 2021 preventing 2021 summer programming and reducing from three to two cohorts. Increase “personnel” by $22,418 for time to increase teacher participation in second cohort and create additional educational materials. Increase “supplies” by $1,400 and "printing” by $7,000 for education materials. Decrease “professional/technical contracts” by $9,952, “travel and conferences”	May 15, 2024	Yes	May 20, 2024

Status Update Reporting

Final Status Update August 14, 2024

Date Submitted: August 14, 2024

Date Approved: November 27, 2024

Overall Update

Pollinators in the Science Classroom (PSC) increased knowledge of action steps to conserve pollinators by training 59 Minnesota science/agriculture teachers of grades 6-12 in pollinator education methods. Collectively, teachers self-reported using PSC curriculum and Pollinator Education Toolkit with over 6,500 students in 18 Minnesota counties, and that they will continue to use these methods to disseminate information to future students. Participants learned about Minnesota pollinator biology, diversity, habitat, and conservation from experts from the University of Minnesota and Monarch Joint Venture, gathered data for projects including The Great Sunflower Project, iNaturalist, and the Monarch Larva Monitoring Project, and conducted their own pollinator research to prepare them to lead students in outdoor ecological investigations. Teachers received a Toolkit and curriculum resources as well as training to utilize them as they share pollinator biology and conservation content with their students. We provided support and resources throughout the school year to mobilize teachers to engage their students. Teachers created or improved over 7,900 square feet of pollinator habitat at their schools so students can support and investigate pollinating insects. PSC was highly successful, based on teachers' feedback, gains in knowledge and confidence, and numbers of students impacted, among other metrics.

Activity 1

Pollinators in the Science Classroom (PSC) Staff assisted 59 workshop teachers (45 in 8-day summer workshops in 2022 and 2023, and 14 at a one-day fall workshop in 2023) as they implemented the PSC curriculum and Pollinator Education Toolkit. PSC trained teachers reported implementing pollinator-focused lessons with over 6,500 students. A monthly newsletter provided program announcements and shared relevant resources, news, and events. The PSC Instructor assisted individual teachers as requests for help arose. Teachers met three times during the school year in small groups to provide support and discuss the implementation of the curriculum and Pollinator Toolkit. A report submitted by the small group to the Program Instructor aided in continual assessment of the program. One teacher stated: "I've been growing plants and prepping for spring. I used the Pollinator Plate activity, the Where Do Bees Go? infographic, and the curriculum to help students learn about pollinators." Another teacher was planning ".. a pollinator party on May 9th where the students will work to plant 300 plants and are inviting community members." A mid-year workshop highlighted implementation progress and hands-on pollinator education activities including dissecting flowers and building bee houses.

(This activity marked as complete as of this status update)

Activity 2

This activity was previously marked complete.

(This activity marked as complete as of this status update)

Activity 3

The PSC course was highly successful, based on teachers' feedback, gains in knowledge and confidence, and numbers of students impacted, among other metrics. PSC "has given me tools and resources to help my students directly interact with the ecosystems in which they live and to have a deeper connection, appreciation and understanding of the natural world around them" and "[implementing the PSC curriculum] resulted in the best outdoor teaching experiences I have ever had" were among many similar comments. Teachers were very positive about the staff, who were "exceptionally kind and accessible." Nearly all PSC activities were highly rated, and were directly used in classrooms during the school year. Teachers' gains persisted 11 months after the course. Teachers collectively used the curriculum with over 6,300

students in 18 counties of MN as a result of PSC workshops, created or improved at least 4,100or 3,875 square feet of pollinator habitat, respectively, and report that they will continue to use and further disseminate what they learned and received. Project leaders improved the program's second year based on formative evaluation feedback from previous participants. These outcomes combine for a positive impact on protecting, conserving, preserving, and enhancing pollinators in Minnesota.
(This activity marked as complete as of this status update)

Dissemination
Resources developed by staff and participants in the program have been integrated into a classroom resources page on the UMN Bee Lab website (beelab.umn.edu/pollinators-classroom-resources). Recruitment for each of the two Pollinators in the Science Classroom professional development cohorts began in March 2022 and 2023 respectively. PSC was promoted to our network of 2,300+ Twin Cities Metro and Greater Minnesota teachers as well as science/ag education organizations such as the 700-member Minnesota Science Teachers Association (MnSTA). A promotional flier directed interested teachers to the PSC website where more information, educational pollinator resources, and the PSC application could be found. In addition, PSC staff collaborated with organizers of the Minnesota Conference on Science Education (MnCOSE), held November 2023 in Rochester, MN, to offer a special one-day PSC conference workshop. Additionally, PSC hosted a conference exhibitor's table, where scientist Elaine Evans and PSC staff spoke with many of the 300 conference attendees from across Minnesota about pollinator biology and conservation and promoted the Pollinator Toolkit.

Additional Status Update Reporting

Additional Status Update May 13, 2024

Date Submitted: May 15, 2024

Date Approved: May 20, 2024

Overall Update
I neglected to update the appropriate budget lines in my very recent amendment. There are no additional updates since that time.

Activity 1
I neglected to update the appropriate budget lines in my very recent amendment. There are no additional updates since that time.

Activity 2
This activity was previously marked complete.
(This activity marked as complete as of this status update)

Activity 3
I neglected to update the appropriate budget lines in my very recent amendment. There are no additional updates since that time.

Dissemination
I neglected to update the appropriate budget lines in my very recent amendment. There are no additional updates since that time.

Status Update Reporting

Status Update June 1, 2024

Date Submitted: April 29, 2024

Date Approved: May 8, 2024

Overall Update
We have trained 59 6-12th grade science/agriculture teachers. Participants learned about the diversity and importance of Minnesota pollinators from bee and butterfly experts from the University of Minnesota and Monarch Joint Venture, gathered data for public participation in science projects including The Great Sunflower Project, iNaturalist, and the Monarch Larva Monitoring Project, and conducted their own pollinator research to prepare them to lead students in outdoor ecological investigations. All educators received and were trained to use the UMN Pollinator Education Toolkit and curriculum resources to support them as they teach about pollinators. Follow-up meetings are taking place during the school year to provide peer support with implementation, and PSC Staff provide ongoing support through monthly newsletters and in a one-on-one on-demand capacity. Mid-year professional development meetings supported teachers with additional pollinator activities and an opportunity to hear implementation successes of other PSC participants.

Activity 1
Teachers receive a monthly Pollinators in the Science Classroom (PSC) newsletter created by PSC Staff to provide program announcements, pollinator-focused resources, current news, and information about upcoming events related to pollinator education. PSC Staff are available to answer questions on-call as questions or issues arise. Additionally, teachers continue to meet three times during the school year in small groups with fellow program participants to provide support and discuss successes and obstacles in implementing the PSC curriculum and the Pollinator Education Toolkit.

Activity 2
This activity was previously marked complete.
(This activity marked as complete as of this status update)

Activity 3
A final evaluation of the program outcomes and impacts is currently in preparation.

Dissemination
No dissemination activities have taken place since the last update.

Status Update Reporting

Status Update December 1, 2023

Date Submitted: December 5, 2023

Date Approved: February 1, 2024

Overall Update

We trained 27 6-12th grade science/agriculture teachers during the 8-day Pollinator Education in the Science Classroom (PSC) workshop in June and July, 2023. Participants learned about the diversity and importance of Minnesota pollinators from bee and butterfly experts from the University of Minnesota and Monarch Joint Venture, gathered data for public participation in science projects including The Great Sunflower Project, iNaturalist, and the Monarch Larva Monitoring Project, and conducted their own pollinator research to prepare them to lead students in outdoor ecological investigations. They also learned about creating and supporting pollinator habitat at their schools as well as other conservation efforts. Fourteen additional teachers participated in a one-day PSC workshop held at the Minnesota Conference on Science Education on November 10, 2023 in Rochester which prepared teachers to lead outdoor ecological investigations with pollinators. All educators received and were trained to use the UMN Pollinator Education Toolkit and curriculum resources to support them as they teach about pollinators. Follow-up meetings are taking place during the school year to provide peer support with implementation, and PSC Staff provide ongoing support through monthly newsletters and in a one-on-one on-demand capacity. A mid-year professional development meeting is scheduled for February 24, 2024.

Activity 1

Teachers receive a monthly Pollinators in the Science Classroom (PSC) newsletter, which is created by PSC Staff to provide program announcements, pollinator-focused resources, current news, and information about upcoming events related to pollinator education. The PSC Instructor regularly offers support and resources as teachers implement pollinator education in their classrooms and schools. Teachers are encouraged to invite the Program Instructor on-site to assist with implementation as needed; however, teachers are wary of ceding time to outside visitors, even in a support capacity, so classroom visits have not yet occurred. PSC Staff are available to answer questions on-call as questions or issues arise. Additionally, teachers meet three times during the school year in small groups with fellow program participants to provide support and discuss successes and obstacles in implementing the PSC curriculum and the Pollinator Education Toolkit. During the fall small group meeting, one teacher stated: “Launching new curriculum is time consuming, but I am finding ways to weave in PSC activities. I’m keeping my head above water…barely!” Another teacher plans to “..continue to teach about pollinators and their impact on the local ecosystem using the PSC curriculum.”

Activity 2

Recruitment for the Summer 2023 professional development workshop began in March 2023 for participation in the 2023-2024 Pollinators in the Science Classroom program (PSC). A promotional flier directed interested teachers to the PSC website beelab.umn.edu/pollinators-science-classroom for more information and the registration form. PSC was promoted to nearly 2,300 teachers in the Twin Cities Metro and Greater Minnesota contained in the PSC database as well as science/ag education organizations.

Twenty-seven grade 6-12 teachers participated in the Summer 2023 PSC workshops held June 26-29 and July 10-13 in the Plant Growth Facility on the UMN St. Paul campus. The PSC instructors include four pollinator biologists as well as two experienced lead educators.

An additional PSC workshop was offered to fourteen Minnesota science educators at the Minnesota Conference on Science Education, held November 10, 2023, in Rochester, MN. Pollinator biologist Elaine Evans and PSC Staff led

activities and lessons in pollinator biology, conservation, and community science. This special PSC workshop was promoted through a flier and through the conference app (Whova) as well as in the MN Science Teacher Association newsletter. Participating teachers received a Pollinator Education Toolkit and curriculum materials.
(This activity marked as complete as of this status update)

Activity 3
Evaluation data collection consisted of pre- and post-course and feedback surveys and two 40-minute focus groups. Participants showed gains in knowledge of scientific research methods and using them in the classroom, and positive changes in their beliefs that using research, the scientific method, and the work of scientists in the classroom are compatible with and will add value to the way they teach. They also reported that the course built their skills, confidence, and self-efficacy. Nearly all program elements were rated "very beneficial" by a majority of respondents; the most beneficial elements were those that are special or unique to the PSC program. A majority of teachers said that their knowledge about data analysis and hypothesis creation and testing increased "to a great extent," and that it increased "moderately" or "to a great extent" in all areas surveyed. Teachers reported that collectively they will use the PSC curriculum with nearly 3,000 students this academic year. They said that to improve the program they would like more practice identifying pollinators, more time to work on their implementation plan in the course, and more computer-based resources. Some expressed that there would be institutional, resource, and time barriers to implementing the curriculum.

Dissemination
Recruitment for the Summer 2023 Pollinators in the Science Classroom (PSC) professional development workshop began in March 2023. PSC was promoted to our network of 2,300+ Twin Cities Metro and Greater Minnesota teachers as well as science/ag education organizations. A promotional flyer directed interested teachers to the PSC website, https://beelab.umn.edu/pollinators-science-classroom, where more information and an application could be found.

PSC staff collaborated with organizers of the Minnesota Conference on Science Education, held November 2023 in Rochester, MN, to offer a special one-day PSC conference workshop. A flyer was emailed to our database of 2,300+ teachers as well as to the 700 Minnesota Science Teachers Association (MnSTA) members to make this opportunity available to conference attendees. MnSTA also promoted the workshop on their social media sites. Additionally, PSC hosted a conference exhibitor's table, where scientist Elaine Evans and PSC staff spoke with many of the 300 conference attendees from across Minnesota about pollinator biology and conservation and promoted the Pollinator Toolkit.

As a result of our two 2023 PSC workshops, teachers will implement the Pollinators in the Science Classroom curriculum and Pollinator Education Toolkit with an estimated 4,100+ students in their classrooms.

Additional Status Update Reporting

Additional Status Update September 6, 2023

Date Submitted: October 4, 2023

Date Approved: February 1, 2024

Overall Update

In June and July of 2023, we trained twenty-seven 6-12th grade science teachers during the Pollinator Education in the Science Classroom workshop. Teachers learned about the diversity and importance of pollinators in Minnesota from bee and butterfly experts from the University of Minnesota and Monarch Joint Venture. They gathered data for pollinator citizen science projects including The Great Sunflower Project, iNaturalist, and the Monarch Larva Monitoring Project. Participants conducted their own pollinator research to prepare them to lead students in outdoor ecological investigations. Teachers also learned about creating and supporting pollinator habitat at their schools and other conservation efforts. Educators received and were trained to use the UMN Pollinator Education Toolkit and curriculum resources to support them as they teach about pollinators in their classrooms. Follow-up meetings took during the school to provide support with implementation.

Activity 1

A monthly newsletter is created and distributed to provide program announcements, pollinator focused resources, current news, and information about upcoming events related to pollinator education. The program instructor will reach out to each workshop participant individually as the school year gets underway to offer support and resources as they work to implement pollinator education in their classrooms and schools. Program staff are available to answer questions on-call as problems or issues arise. Additionally, teachers will meet in small groups this fall with fellow program participants to provide support and discuss successes and obstacles in implementing the Pollinator curriculum and Toolkit. A mid-year, one-day workshop is planned for February 24, 2024, where the teachers will be able to discuss their implementation progress, share tools and materials that they have developed, and increase their knowledge of pollinator biology through a presentation by a guest pollination biologist.

Activity 2

Recruitment of Pollinators in the Science Classroom (PSC) grade 6-12 science and agriculture teachers in the Twin Cities Metro as well as Greater Minnesota began in March 2023. A promotional flier was emailed to over 2,300 teachers and administrators from our Twin Cities Metro and Greater MN databases, as well as organizations such as the Minnesota Science Teachers Association, Minnesota Association of Agricultural Educator, and the Minnesota Department of Education. The flier directed interested teachers to the PSC Website, https://beelab.umn.edu/pollinators-science-classroom , where the PSC Application could be found. Twenty-seven teachers were selected to participate in the program based on several factors, including if they applied with a co-teacher, which area of science they taught, and their answer to the application question, “Why would you like to participate in PSC?”.

The Summer 2023 PSC workshops were held June 26-29 and July 10-13 in the Plant Growth Facility on the UMN St. Paul campus. The PSC instructors include four pollinator biologists, Evans, Blair, Dr. Dan Cariveau from the UMN Bee Lab, and Katie-Lyn Bunney from the Monarch Joint Venture, as well as two experienced lead educators who have previously implemented the pollinator curriculum in classrooms.

Activity 3

Pollinators in the Science Classroom has undergone a rigorous, independent evaluation to assess and improve its quality. Specifically, the evaluator, Amy Myrbo of Amiable Consulting, has examined the summer workshop objectives and execution and will also assess the mid-year workshop objectives and execution and the implementation of the pollinator curriculum and educational toolkit in teacher participants’ classrooms. The evaluator will conduct formative evaluation

while the program is happening in order to improve its execution. Evaluation data collection consisted of pre- and post-course surveys of the participating teachers, a feedback survey, and focus groups. Results will continue to assist with the improvement of the program. Summer 2023 results are pending.

Dissemination

Our Summer 2023 workshop participants consist of twenty-seven teachers from around the state of Minnesota. They represent 21 different school districts in twelve counties in Minnesota
(Anoka, Chisago, Crow Wing, Dakota, Douglas, Hennepin, Houston, Morrison, Ramsey, St. Louis, Sterns, Steele, Washington, and Wright). Teachers will implement the Pollinators in the Science Classroom curriculum and Pollinator Education Toolkit with an estimated 3,500+ students in their classrooms.

Status Update Reporting

Status Update June 1, 2023

Date Submitted: June 12, 2023

Date Approved: June 15, 2023

Overall Update

We continue to underscore the importance of the diversity, habitat, and conservation of pollinators in Minnesota as we educate and mobilize teachers to engage their students around the topics of pollinators. As a result, teachers have responded with an overwhelming desire to create pollinator habitats at their schools so students can support and investigate pollinating insects. The summer teachers' experiences with public participation science projects as well as their own pollinator research prepared them to lead students in outdoor ecological investigations. Teacher training on how to use UMN Pollinator Education Toolkit and curriculum resources provided support and activities to engage their students on these topics. This cohort of teachers report implementing the Pollinator Toolkit/curriculum with approximately 2,200 students over the 2022-2023 school year.

Activity 1

Throughout the school year, we continue to regularly support the eighteen 6-12th grade science teachers who participated in the Pollinator Education in the Science Classroom workshops. Teachers receive monthly resources about pollinator garden grants for educators, pollinator-related science projects using public participation, and scientific inquiry-related activities. One of the participants brought students to the University of Minnesota Extension Ecology Science Fair on the St. Paul campus in January 2023. There students presented the findings of their independent ecology-focused research to University of Minnesota scientist interviewers in an exciting event that celebrated student achievement in science. During our mid-year meeting in February, a panel of five workshop participants shared how they've implemented the pollinator curriculum and toolkit with their students. Their stories included student participation in a public participation in science project called The Great Sunflower Project, plans to create pollinator gardens and pocket prairies, creation of container gardens in an urban with documentation of pollinator use, and using the Pollinator Toolkit to engage high school students in leadership roles around younger students. All participants had time to reflect on their curriculum implementation and discuss future plans with others. Also at this mid-year meeting, we also modeled a flower dissection activity and

Activity 2

Recruitment of Pollinators in the Science Classroom (PSC) grade 6-12 science and agriculture teachers in the Twin Cities Metro as well as Greater Minnesota began in March 2023. A promotional flier was emailed to over 2,300 teachers and administrators from our Twin Cities Metro and Greater MN databases, as well as organizations such as the Minnesota Science Teachers Association, Minnesota Association of Agricultural Educator, and the Minnesota Department of Education. The flier directed interested teachers to the PSC Website, https://beelab.umn.edu/pollinators-science-classroom , where the PSC Application could be found. Twenty-eight teachers were selected to participate in the program based on several factors, including if they applied with a co-teacher, which area of science they taught, and their answer to the application question, "Why would you like to participate in PSC?".

The Summer 2023 PSC workshops will be held June 26-29 and July 10-13 in the Plant Growth Facility on the UMN St. Paul campus. The PSC instructors include four pollinator biologists, Evans, Blair, Dr. Dan Cariveau from the UMN Bee Lab, and Katie-Lyn Bunney from the Monarch Joint Venture, as well as two experienced lead educators who have previously implemented the pollinator curriculum in classrooms.

Activity 3

There have been no new evaluation activities since our report in December of 2022.

Dissemination

Our Summer 2023 workshop participants consist of 28 teachers from around the state of Minnesota. They represent 21 different school districts in twelve counties in Minnesota (Anoka, Chisago, Crow Wing, Dakota, Douglas, Hennepin, Houston, Morrison, Ramsey, St. Louis, Sterns, Steele, Washington, and Wright). Teachers will implement the Pollinators in the Science Classroom curriculum and Pollinator Education Toolkit with an estimated 3,500+ students in their classrooms.

Status Update Reporting

Status Update December 1, 2022

Date Submitted: November 29, 2022

Date Approved: November 29, 2022

Overall Update

In June and July of 2022, we trained eighteen 6-12th grade science teachers during the first of three Pollinator Education in the Science Classroom workshops. Teachers learned about the diversity and importance of pollinators in Minnesota from bee and butterfly experts from the University of Minnesota and Monarch Joint Venture. They gathered data for pollinator citizen science projects including The Great Sunflower Project, iNaturalist, and the Monarch Larva Monitoring Project. Participants conducted their own pollinator research to prepare them to lead students in outdoor ecological investigations. Teachers also learned about creating and supporting pollinator habitat at their schools and other conservation efforts. Educators received and were trained to use the UMN Pollinator Education Toolkit and curriculum resources to support them as they teach about pollinators in their classrooms. Follow-up meetings took during the school to provide support with implementation.

Activity 1

A monthly newsletter is created and distributed to provide program announcements, pollinator focused resources, current news, and information about upcoming events related to pollinator education. The program instructor reached out individually to each workshop participant to offer support and resources as they work to implement pollinator education in their classrooms and schools. Repeated offerings to assist teachers on-site at their schools were made. Due to continued COVID caution and pandemic-related learning deficiencies, schools and teachers are wary of ceding time to outside visitors, even in a support capacity, so classroom visits by program staff have not occurred. Program staff are available to answer questions on-call as problems or issues arise. For example, one teacher was collecting data for the citizen science project, Great Sunflower Project, in which students observe flowers and count insect flower visitors. The teacher reached out to staff to make sure her students knew how to properly count the number of flowers when observing a species that has dense flower heads with multiple blossoms. Additionally, teachers met in small groups this fall with fellow program participants to provide support and discuss successes and obstacles in implementing the Pollinator curriculum and Toolkit.

Activity 2

Recruitment for the Summer 2023 professional development workshop will begin in March 2023 with the goal of recruiting 18 Minnesota grade 6-12 science teachers for participation in the 2023-2024 Pollinators in the Science Classroom program (PSC). A promotional flier will direct interested teachers to the PSC website beelab.umn.edu/pollinators-science-classroom for more information and the registration form. PSC will be promoted to nearly 1,000 teachers in the Twin Cities Metro as well as Greater Minnesota contained in the PSC database as well as organizations such as the Minnesota Science Teachers Association and the Minnesota Department of Education.

Activity 3

Evaluation data collection consisted of pre- and post-course surveys of the participating teachers, a feedback survey, and focus groups. Participants showed gains in their knowledge of using research methods to teach science and reported that the course built their confidence and self-efficacy. They also were very positive about the curriculum provided to them in the course; one participant said, “I will directly use [in the classroom] everything that I am doing in these two weeks.” Some participants reported that they would need help mapping the material onto state science standards, and that there might be institutional barriers to their adopting the curriculum. The teachers were overwhelmingly positive about the instructional staff, who were characterized by one participant as “exceptionally kind and accessible,” and by another as “approachable and clearly knowledgeable and informed.”

Dissemination

Our workshop participants consisted of 18 teachers from around the state of Minnesota. They represented 15 different school districts in eight counties in Minnesota
(Anoka, Carlton, Dakota, Douglas, Hennepin, Ramsey, St. Louis, and Wright). Teachers will implement the Pollinators in the Science Classroom curriculum and Pollinator Education Toolkit with 2,200 students in their classrooms. In addition, The Bee Lab Research newsletter in November 2022 included a description and highlights, along with photos, of the summer Pollinator teacher workshop. This newsletter has a subscribership of 5,000 people.

Status Update Reporting

Status Update June 1, 2022

Date Submitted: July 20, 2022

Date Approved: July 27, 2022

Overall Update
Our primary objective is to share clear, expert-guided information and action steps with professional educators who will in turn reach thousands of students and their families. We are currently preparing to give our first of three Pollinator Education in the Science Classroom workshops. We accepted eighteen teachers to participate in two weeks of training in June and July of 2022. Experts on bee and butterfly pollinators provide detailed background information to enable adaptation on Pollinator Curriculum and Pollinator Education Toolkits to specific classroom needs. Training prepares teachers to engage their students in pollinator research and teach action steps to conserve pollinators, include creating and evaluating pollinator habitat, reducing exposure of pollinators to pesticides, and documenting pollinator populations to inform conservation efforts.

Activity 1
Due to late receipt of funding due to the legislative schedule, we were unable to assist teachers with implementation as we could not organize workshops for the summer of 2021. We will provide year-round assistance for our first cohort of science classroom teachers by June of 2023. We have developed a schedule to engage teachers from the upcoming 2022 summer workshops during the 2022-2023 school year to implement pollinator education in their classrooms and schools. We have increased funds to support increased costs of stipends for teachers to cover increased cost and to support lead teachers. We have also increased funds for printing to produce UMN Pollinator Toolkits to support year-round enabling of pollinator education in the classroom.

Activity 2
Due to late receipt of funding due to the legislative schedule, we were unable to organize workshops for summer of 2021. We trained teachers in June and July of 2022. We recruited eighteen middle- and high-school teachers. Recruitment emphasized underserved urban and rural school districts throughout the state. In June, we will spent one week using the NSF-funded Driven to Discover: Citizen Science Curriculum Guide, Pollinators and the Great Sunflower Project and the UMN Pollinator Education Toolkit to learn about pollinator biology, citizen science, and the scientific processes. The teachers conducted independent scientific studies. In July of 2022, we spent one week helping teachers plan implementation of materials and toolkit, and leading students in independent studies during the school-year.

Our team consists of four pollinator biologists, Evans, Blair, Dr. Ian Lane from the UMN Bee Lab, and Katie-Lyn Bunney from the Monarch Joint Venture, and two experienced lead educators who have previously implemented the pollinator curriculum in classrooms. We added a bee specialist position, Dr. Ian Lane, to provide expert bee content to guide development of independent projects as divided the cohort into two groups. In addition, Dr. Blair was less available for this function due to his becoming chair

Activity 3
Due to late receipt of funding due to the legislative schedule, our program did not start until the summer of 2022 and so evaluation of the first workshop will not be available until June of 2023 .We have engaged evaluator Amy Myrbo, who will be surveyed participants during week one of the workshop and will also conduct a mid school year survey to evaluate implementation of the program in the classroom.

Dissemination
Recruitment of Pollinators in the Science Classroom (PSC) grade 6-12 science teachers in the Twin Cities Metro as well as

Greater Minnesota began March 8, 2022. We emailed a flyer to over 980 teachers and administrators, as well as organizations such as the Minnesota Science Teachers Association and the Minnesota Department of Education as well as a database we assembled containing contact information for 20 Greater Minnesota school districts, and the email invitation flyer. The flyer directed interested teachers to the PSC Website, https://beelab.umn.edu/pollinators-science-classroom , where the PSC Application could be found. The final total applicant count was 43. 18 were selected based on several factors, including if they applied with a co-teacher, which area of science they taught, and their answer to the application question, “Why would you like to participate in PSC?”. Those who were not initially selected were placed on a waiting list. Two of the original 18 participants had to withdraw for personal reasons, so 2 teachers on the waiting list were able to participate. All applicants not selected will be sent application information for the 2023-24 PSC program.